

### REMARKS

Claims 1-9, 11-13, 18-20, 49-64 are currently pending and stand rejected. Claims 1, 2, 4-9, 11-13, 18-20, 50, 51, and 53-64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bitler et al. (U.S. Pat. No. 6,255,367) in view of "Supercritical Fluids in Heterogeneous Catalysis" by Baiker. Claims 1-7, 20, 50-56, and 64 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Tacke et al. (U.S. Pat. No. 5,734,070). It is noted that Claim 49 is listed as being rejected on the PTO-326 form but is not specifically rejected in the text of the Action. The Applicants respectfully traverse all of the rejections.

#### 35 U.S.C. § 103(a) Rejections

Claims 1, 2, 4-9, 11-13, 18-20, 50, 51, and 53-64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Bitler et al. (U.S. Pat. No. 6,255,367) and the reference entitled "Supercritical Fluids in Heterogeneous Catalysis" by Baiker.

In order to maintain a *prima facie* obviousness rejection, the following criteria must be met:

To establish a *prima facie* case of obviousness, three basic criteria must be met. **First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.** Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

See, M.P.E.P. §2142, citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991) (emphasis added).

Independent Claim 1 recites a method for carrying out a catalysis reaction in carbon dioxide comprising "contacting a fluid mixture with a catalyst bound to a polymer...wherein the polymer is soluble in carbon dioxide." The combination of Bitler et al. with Baiker does not establish a *prima facie* case of obviousness against Claim 1 because there is no motivation to

combine the references and because the combination, even if motivated, fails to teach or suggest all of the recitations of Claim 1.

The Action maintains the outstanding obviousness rejection based upon the combination of Bitler et al. and Baiker. A *prima facie* obviousness rejection of a claim is not appropriate unless there is some motivation, either in the references themselves or in the art, to combine the references to make obvious the claim. The Action maintains that the "motivation to employ supercritical carbon dioxide during hydrogenation is the desire for greater hydrogen solubility." See, *Action* at p. 6. Yet neither reference indicates that there is a desire for greater hydrogen solubility in the Bitler et al. process. Bitler et al. never mentions a desire to improve hydrogen solubility during its processes. Similarly, Baiker does not indicate that there would be a desire to increase hydrogen solubility in the Bitler et al. process. Baiker only proposes that supercritical solvents, such as carbon dioxide, may be applied advantageously as solvents in some hydrogenation reactions, and in particular to the hydrogenation of fats and oils. Baiker does not propose that the addition of supercritical carbon dioxide to the processes proposed by Bitler et al. would provide greater hydrogen solubility in the process. Further, the hydrogenation reactions proposed by Bitler et al. involve the hydrogenation of alkenes, not fats and oils as discussed by Baiker. There are no proposals in either of the combined references that would lead one of skill in the art to determine that there is a desire to increase hydrogen solubility in the Bitler et al. process, therefore, the motivation recited in the Action is lacking in the references and the art. In addition, no other motivation exists to combine Bitler et al. with Baiker to make obvious Claim 1. The lack of motivation precludes a *prima facie* obviousness rejection of the claims. See, *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Furthermore, the Applicants' disclosure cannot be used to motivate the combination of references. The only reference that proposes a catalyst bound to a polymer that is soluble in carbon dioxide is the Specification of the present Application, which cannot be used to motivate the combination of two references that would otherwise not be combined.

Bitler et al. also fails to propose the contacting of a fluid mixture with a catalyst bound to a polymer wherein the polymer is soluble in carbon dioxide as recited in Claim 1. Likewise, Baiker does not propose a catalyst bound to a polymer that is soluble in carbon dioxide. Since

neither reference teaches or suggests a catalyst bound to a polymer wherein the polymer is soluble in carbon dioxide, a *prima facie* case of obviousness is lacking. See, *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Additionally, Bitler et al. admittedly fails to suggest contacting a polymer with carbon dioxide. Similarly, Baiker fails to suggest contacting a polymer soluble in carbon dioxide with carbon dioxide. The failure of the references to teach or suggest all of the claim limitations precludes a *prima facie* obviousness rejection.

Claims 2, 4-9, 11-13, and 18-20 depend from independent Claim 1. As dependent claims of a nonobvious independent claim, Claims 2, 4-9, 11-13, and 18-20 are also nonobvious. See, *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988)(stating that if an independent claim is nonobvious under 35 U.S.C. § 103 then any claim depending therefrom is nonobvious); see also, M.P.E.P. § 2143.03.

Independent Claim 50 recites a method for carrying out a catalysis reaction in carbon dioxide comprising "contacting a fluid mixture with a catalyst bound to a polymer...wherein the polymer is insoluble and swellable in carbon dioxide." The combination of Bitler et al. with Baiker does not establish a *prima facie* case of obviousness against Claim 50 because there is no motivation to combine the references and because the combination, even if motivated, fails to teach or suggest all of the recitations of Claim 50.

As with Claim 1, no motivation exists to combine Bitler et al. with Baiker to make obvious Claim 50. Neither Bitler et al. nor Baiker indicate that there is a desire to provide greater hydrogen solubility in the Bitler et al. process. Even if a general desire to improve hydrogen solubility in hydrogenation reactions exists, one of skill in the art would not be motivated to combine Bitler et al. and Baiker because Baiker does not propose that the addition of supercritical carbon dioxide to all hydrogenation reactions will improve hydrogen solubility. Baiker also fails to propose that the addition of supercritical carbon dioxide would improve hydrogen solubility in processes involving the heating of heat-sensitive polymers to initiate polymerization reactions, as taught by Bitler et al. The failure of the references to motivate the combination of references proposed by the Action precludes a *prima facie* obviousness rejection of Claim 50.

Claim 50 is also nonobvious because the combination of references fails to teach or suggest all of the recitations of Claim 50. In particular, Claim 50 recites contacting carbon dioxide with a polymer that "is insoluble and swellable in carbon dioxide." Neither Bitler et al. nor Baiker propose contacting polymers that are insoluble and swellable in carbon dioxide with carbon dioxide as recited in Claim 50. The failure of the cited references to teach or suggest such recitations precludes a *prima facie* obviousness rejection. See, *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

Claims 51 and 53-64 depend from independent Claim 50. As dependent claims of a nonobvious independent claim, Claims 51 and 53-64 are also nonobvious. See, *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988)(stating that if an independent claim is nonobvious under 35 U.S.C. § 103 then any claim depending therefrom is nonobvious); see also, M.P.E.P. § 2143.03.

The Applicants respectfully request the withdrawal of the obviousness rejections of Claims 1, 2, 4-9, 11-13, 18-20, 50, 51, and 53-64 under 35 U.S.C. § 103(a) based upon the combination of Bitler et al. and Baiker because a *prima facie* obviousness case is not supported by the cited references.

### **35 U.S.C. § 102(b) Rejections**

The Action continues to maintain that Claims 1-7, 20, 50-56 and 64 are anticipated by Tacke et al. under 35 U.S.C. § 102(b). Under 35 U.S.C. § 102, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. § 2131 (quoting *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987)). Tacke et al. fails to teach or suggest polymers that are soluble in carbon dioxide or swellable in carbon dioxide, thereby failing to describe each and every element of the claims and failing to anticipate the claims.

Independent Claim 1 recites more than just "a method for carrying out a reaction in carbon dioxide." See, *Action* at p. 5. Claim 1 specifically recites "a catalyst bound to a polymer...wherein the polymer is soluble in carbon dioxide." Tacke et al. does not disclose,

either expressly or inherently, such catalyst bound polymers. In particular, Tack et al. proposes a solid bed reaction process wherein catalysts in the solid bed are deposited on support structures "in order to provide as great a metal surface as possible for the catalytic process." *See, Tacke et al.* at col. 3, lines 60-62. Although the catalyst support structures used for the solid bedding of Tacke et al. may include polymers, Tacke et al. does not propose that the polymers are soluble in carbon dioxide, or in any supercritical solvents proposed by Tacke et al. Further, Tacke et al. does not propose the use of polymers that are soluble in carbon dioxide as the catalyst support structures.

The Action alleges that the polymer composition of Tacke et al. "would inherently have the same solubility characteristics as that claimed by applicants' because the same composition subjected to the same conditions (e.g. the presence of carbon dioxide) displays the same physical characteristics." *See, Action* at p. 5. However, Tacke et al. never proposes soluble polymer compositions as catalyst support structures. Therefore, Tacke et al. does not propose the same compositions as those recited in Claim 1. The failure of Tacke et al. to expressly disclose polymer compositions that are soluble in carbon dioxide or to inherently disclose polymer compositions that may be soluble in carbon dioxide precludes the anticipation rejection of Claim 1. *See, Verdegaa Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

In response to the Applicants' previous arguments, the Action also maintains "that the disclosed polymers would have similar solubility characteristics under like conditions because the references disclose polymer compositions with the same final composition as those claimed by claimed by applicants [sic]. The same composition would display similar characteristics (e.g. solubility) under like conditions such as the presence of carbon dioxide." *See, Action* at pp. 6-7. However, the Office has not established that the solid catalyst support structures proposed by Tacke et al. have the same composition as the polymers recited in Claim 1 and the claims depending therefrom. Unless the Office first establishes that the structures of Tacke et al. are indeed the same as those recited in the claims of the present application, the argument fails. Noe of the Action have established this. Furthermore, Tacke et al. makes it clear that the catalyst support structures used in its solid bed reactors are solid. As those skilled in the art would

realize, catalytic support structures in solid bed reactors are solid in order to maximize the surface area available for reaction. If the support structures of Tacke et al. are soluble in carbon dioxide, a solid bed reaction scheme could not be accomplished. Thus, the argument that the support structures of Tacke et al. are the same composition as those recited in Claim 1 fails.

The failure of Tacke et al. to propose catalysts bound to polymers that are soluble in carbon dioxide precludes the rejection of independent Claim 1 because "each and every element" of Claim 1 is not proposed. *See, Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Claim 1 is allowable and withdrawal of the 35 U.S.C. § 102(b) anticipation rejection of Claim 1 is respectfully solicited.

Claims 2-7 and 20 each depend from Claim 1. As independent claims, Claims 2-7 and 20 inherit the recitations of Claim 1. Because Tacke et al. fails to teach each and every element of Claim 1, Tacke et al. also fails to teach each and every element of those claims depending from Claim 1. As such, Claims 2-7 and 20 are not anticipated by Tacke et al. and should be allowed over the anticipation rejection.

Independent Claim 50 recites, in part, "a catalyst bound to a polymer...wherein the polymer is insoluble and swellable in carbon dioxide." Tacke et al. does not disclose a polymer support structure that is swellable in carbon dioxide and therefore fails to anticipate Claim 50. *See, Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Although the catalyst support structures proposed by Tacke et al. are insoluble in carbon dioxide, Tacke et al. does not propose that its catalyst support structures are swellable in carbon dioxide. The Action alleges that Tacke et al.'s proposed catalyst support structures would have similar solubility characteristics to the polymer compositions recited in Claim 50 because Tacke et al. "disclose polymer compositions with the same final composition as those claimed by claimed by applicants [sic]." *See, Action* at p. 6. However, the Office has not demonstrated that the compositions disclosed by Tacke et al. are the same as those recited in Claim 50. Without first meeting this burden, the arguments in the Action do not support the anticipation rejection of Claim 50 under 35 U.S.C. § 102(b). Applicants respectfully request the withdrawal of the anticipation rejection of Claim 50.

Claims 51-56 and 64 each depend from independent Claim 50. As dependent claims, the recitations of Claim 50 are incorporated in Claims 51-56 and 64. The failure of Tacke et al. to propose each and every recitation of Claim 50 also bars an anticipation rejection of Claims 51-56 and 64, which depend from independent Claim 50.

### CONCLUSION

The concerns of the Examiner addressed in full, Applicants respectfully request withdrawal of the outstanding rejections and the issuance of a Notice of Allowance forthwith. The Examiner is encouraged to direct any questions regarding the foregoing to the undersigned, who may be reached at (919) 854-1400.

Respectfully submitted,



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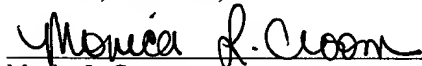
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